A Case report of a Serratia Marcescens infective arthritis after a knee arthroscopy

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Citation

A Malhas, R Chana, F Khan. *A Case report of a Serratia Marcescens infective arthritis after a knee arthroscopy*. The Internet Journal of Orthopedic Surgery. 2006 Volume 7 Number 2.

Abstract

Serratia Marcescens infection of the joints is a very rare occurrence with sporadic reports in the English literature. We report a case of S. Marcescens infection in a knee joint after an arthroscopy in a diabetic patient who underwent circumcision in the past (for a tight phimosis and recurrent balanitis). The patient's urinary system was colonised by the pathogen and was spread (possibly haematologically) to a knee joint which recently underwent arthroscopy. We focus on its management and a review of the world literature (in English). Care must be undertaken to ensure that there are no septic foci that may result in joint and bone infection, in any elective orthopaedic procedure. Any clinically suspected joint infection must be treated as septic arthritis until proven otherwise.

INTRODUCTION

Major joint infections with Serratia Marcescens are rare. They have been sporadically reported in the literature in case reports and several studies [1,2,3,4,5]. S. Marcescens is an opportunistic gram-negative bacillus and is the only pathogenic species of Serratia. It can characteristically form a red pigment. Serratia tends to colonise respiratory, urinary and gastrointestinal tracts [6,7].

The largest outbreak of Serratia joint infections was found to have been caused by contamination of disinfectant fluid used for skin preparation prior to intra-articular injection in a rheumatology clinic [5]. Aside from this, the majority of cases occur in prosthetic joint replacement [1,2,3]. Furthermore, immunocompromised status (such as post transplant patients [4]) tends to increase the number of S. Marscecens infections. All these case have mostly been reported in the United States of America (and one European [2]). S. Marcescens infection also appears prevalent in the Far East (although not in joints).

We report a case of a S. Marcescens infection in a patient following a knee arthroscopy. To our knowledge, this is the first case reported after arthroscopy and the first reported S. Marcescens joint infection in the United Kingdom in the literature.

CASE REPORT

A 66 year old man was being followed up as an orthopaedic outpatient since 2002 for osteoarthritis on both knees. He also suffered from type II diabetes which was diet controlled and had a penicillin allergy. Otherwise he was in good health.

In 2006 he was referred to the urology department with recurrent balanitis and a tight phimosis. On the 07/03/2006 he underwent a circumcision and suffered an infection in the wound and had to have a repeat circumcision on the 26/04/2006. Mid-stream urine samples and wound swabs at the time revealed mixed organisms and skin/faecal flora respectively. He was discharged without further incident. A repeat urine sample culture resulted in no organisms grown.

On the 02/06/2006 (five weeks later) the patient underwent an arthroscopy of his right knee to reassess his osteoarthritis as he developed increasing pain (especially on the medial joint line). There were predominately grade III to IV changes throughout the knee and a stable vertical medial meniscal tear, which was resected. The procedure was performed with cefuroxime antibiotic cover and 10mls of 5% chirocaine intra-articularly for symptomatic relief. The patient was discharged without incident.

The patient presented to the accident and emergency department eight days later with a two-day history of severe

right knee pain, swelling and redness. On examination, the knee was visibly swollen, hot to touch with a decreased range of movement. He was systemically well. Although his white cell count (WCC) was normal, his erythrocyte sedimentation rate (ESR) was 21mm/hr and C-reactive protein (CRP) was 179mg/l. Radiographs were unremarkable (Figure 1).

Figure 1

Figure 1: Plain radiograph of the right knee on admission.

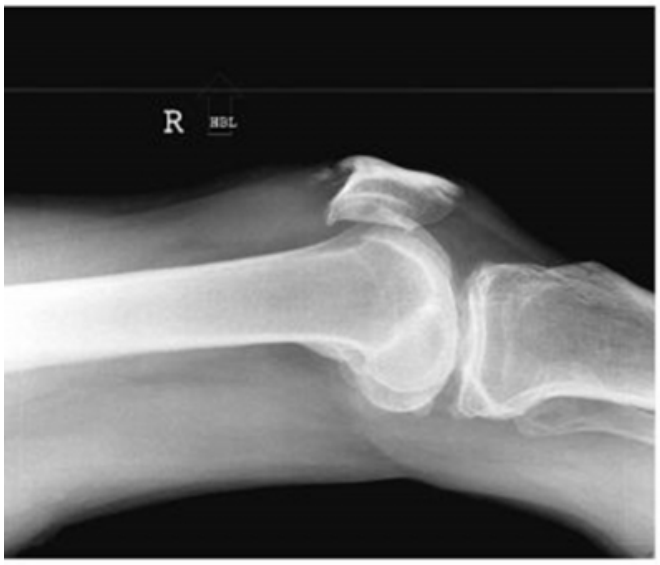
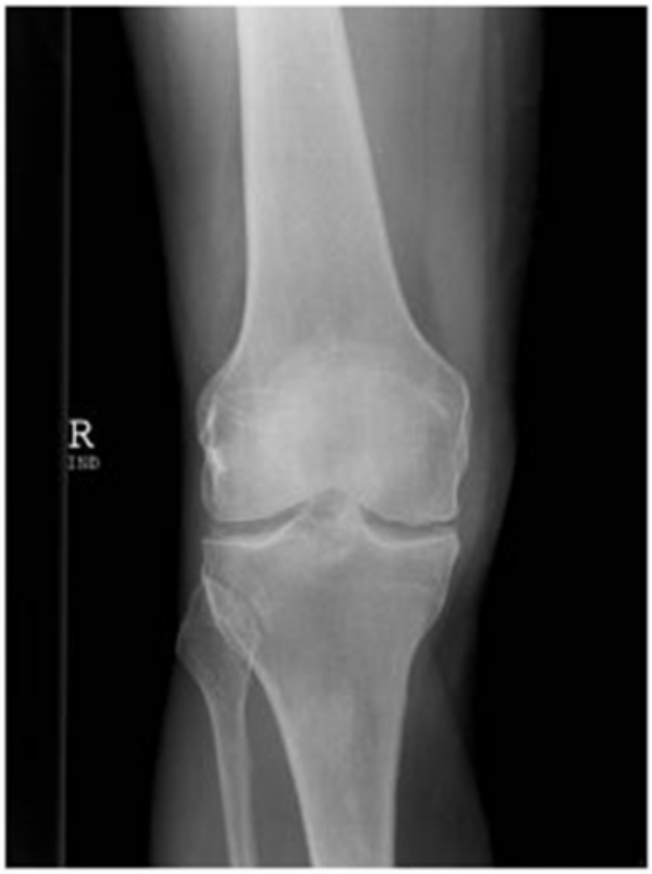


Figure 2



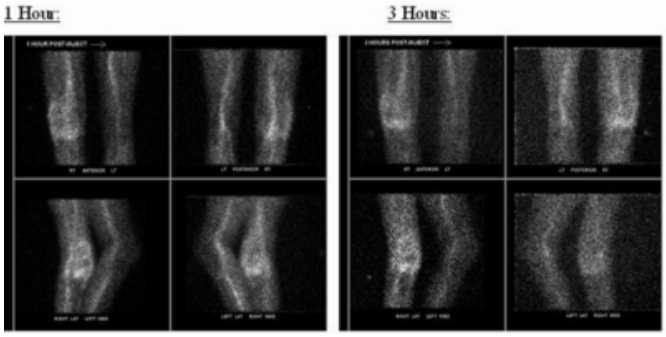
A knee aspiration was performed and the initial gram stain revealed no crystals, moderate white cells and no organisms.

The patient was admitted and started on a course of intra-venous (IV) clindamycin (due to his penicillin allergy). Cultures later identified a gram negative bacillus on enrichment culture and the patient was taken to theatre for an arthroscopic washout on the 14/6/6. The arthroscopy some revealed frank pus and a marked red pigmentation. The knee was washed out with 6L of normal saline and then 180mg of gentamycin was injected intra-articularly.

Final blood and aspirate cultures confirmed Serratia Marcescens on enrichment which was resistant to amoxicillin, cefuroxime and trimethoprim. It was however sensitive to ciprofloxacin. In discussion with the microbiology department, the patient's antibiotics were changed to IV ciprofloxacin, gentamycin and meropenim and a week's treatment with IV vancomycin. On the 6/7/2006 a nuclear medicine leucoscan demonstrated some residual inflammatory action in the knee (Figure 2).

Figure 3

Figure 2: NM Leukoscan of the knee joints. Note increased uptake of the marker in the right knee at 1 and 3 hours.



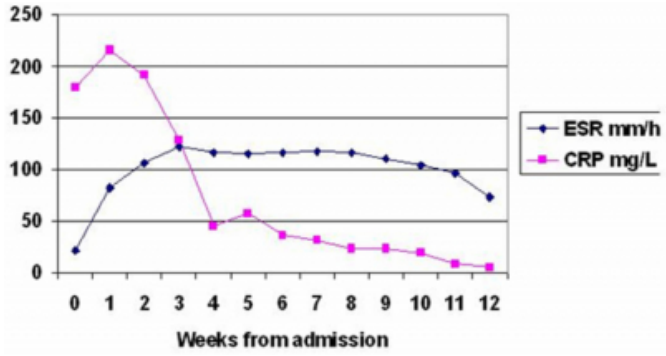
An ultrasound scan of the urinary tract revealed no marked abnormality. A urine sample demonstrated no growth.

The patient's knee continued to swell and so received a further washout on the 17/6/6 with 9L of normal saline and an intra-articular injection of both 180mg gentamycin and 400mg ciprofloxacin was given.

The patient remained on IV antibiotics for ten weeks and his inflammatory markers were closely monitored (Graph 1).

Figure 4

Graph 1: ESR and SRP markers from day of admission.



Throughout he remained systemically well with normal WCC and well controlled blood sugar levels.

The patient was finally discharged on oral antibiotics on 25/8/6 once he showed clinical and biochemical signs of the infection resolving and his CRP returned to normal (and remained normal).

DISCUSSION

The S. Marcescens infection of the patient's knee after arthroscopy was a surprising and rare event. There has not been a case of such an infection before in our hospital.

We feel that the episodes of urinary infection, post circumcision infection, past catheterisation and his history of diabetes lead to a colonisation of the patient's urinary tract system by S. Marcescens. Around 90% of Serratia urinary tract infections are found after instrumentation of the urinary tract [10], which is more prevalent in urinary tract obstruction and diabetes mellitus. S. Marcescens is known to colonise human urothelium [8,9,10]. Great care must be taken, particularly in elective procedures, to ensure that there are no septic foci when undertaking joint arthroscopies or prosthetic joint replacements.

It is important to ask whether the organism spread via direct contamination or by haematological spread. Serratia can colonize some water based antiseptic fluids (such as aqueous chlorhexidine)[5,11], However, the knee was prepared preoperatively with alcohol based betadine. Given the bacteraemia was found on blood cultures and the single isolated case, we are inclined to support haematogenous infection.

Septic arthritis itself carries an 11-15% mortality rate and around 40% of patients will require surgical intervention [12,13,14]. S. Marcescens septicaemia carries an overall mortality of about 30% [15] and can give rise to endocarditis and meningitis [16]. The patient will require careful follow-up on discharge to ensure no further colonisation.

The antibiotics of choice in the literature are: amikacin, meropenim and ciprofloxacin [6,17]. Fortunately the patient was started on the later two shortly after the organism was identified. There are cases of increasingly resistant S.Marcescens, particularly in the Far East [18,19,20]. There is rising resistance to trimethoprim, ampicillin, cefotaxime and piperacillin in particular [18,21]. This perhaps accompanies rising infection rates of resistant organisms in the ITU setting [22,24].

In accordance with British Society of Rheumatology (BSR) approved guidelines on management of the swollen joint [25].

- There was a high clinical suspicion of septic arthritis, which was immediately treated with IV antibiotics even though the initial stain was negative. Joint infection can often give negative cultures and indeed the organism was picked up on enrichment.
- The antibiotics were adjusted appropriately on culture and sensitivity and the patient received a minimum of two weeks IV antibiotics, followed by

oral antibiotics on discharge.

- Inflammatory markers were used to guide the duration of treatment.
- The joint was aspirated washed out on two occasions, until no further fluid collections occurred.

CONCLUSION

Potential septic arthritis must be treated with a high index of suspicion with prompt aspiration and administration of antibiotics. Rare pathogens require swift identification and appropriate management with microbiology input. Care must be taken to ensure that an infection is an isolated case and not the start of an epidemic. In any elective orthopaedic procedure, care must be undertaken to ensure there are no septic foci that may result in joint and bone infection, particularly in the urinary system.

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